Montana Clinical Communication & Surveillance Report

MONTANA
CARDIOVASCULAR HEALTH AND DIABETES PROGRAMS

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ACUTE ISCHEMIC STROKE: DIAGNOSTIC AND TREATMENT RESOURCES IN MONTANA AND NORTHERN WYOMING

WHAT'S INSIDE

BACKGROUND

Stroke is the third leading cause of death and a major cause of significant disability. Approximately 700,000 persons in the U.S. experience a new or recurrent stroke annually[1]. In Montana almost 550 people die of stroke each year[2]. Although thrombolytic therapy has been used for heart attacks for many years, it was not until 1998 that the National Institute of Neurological Disorders recombinant tissue plasminogen activator (rt-PA) trial showed that ischemic stroke outcomes could be improved using thrombolysis in carefully selected patients treated within three hours of onset of stroke symptoms[3]. Recent studies found that rt-PA can be safely administered in community hospitals, but making the diagnosis of stroke type with computed tomography (CT) scanning and initiating therapy within three hours of onset of stoke symptoms is challenging[4-5]. In order to increase the appropriate use of rt-PA in Texas, one successful program used multilevel interventions targeting the knowledge and behavior of the public, the response of emergency medical services, and the coordination of diagnostic and treatment facilities at community hospitals[6-7]. In addition, several rural areas have described their experience coordinating stroke diagnostic and treatment protocols across a region to improve access[8-9].

This is the second of two reports on activities related to stroke prevention and care in Montana. The previous report showed the level of awareness of signs and symptoms of stroke among residents of Cascade and Yellowstone counties. Rural and frontier communities in Montana and northern Wyoming face

significant challenges in delivering quality acute stroke care and prevention programs due to limited resources, adverse weather conditions and long geographic distances to tertiary care facilities. In 2004, we conducted an assessment of hospitals in Montana and northern Wyoming to describe the availability of diagnostic technologies, programs, and personnel for acute stroke care.

METHODS

All acute care inpatient medical facilities in Montana and northern Wyoming were identified through the Montana and Wyoming State Departments of Health. Each facility was contacted to identify the medical director and to designate a stroke specialist to complete a 43-item questionnaire adapted from surveys used in other states. Designees who did not respond to the initial mailing were contacted by telephone to request their completion. Data analyses were completed using SPSS V11.5 software (SPSS Inc., Chicago, Il.). Chi-square tests were used to compare differences in the availability of individual diagnostic tests, programs, and personnel for acute stroke care stratified by hospital bed size. Large hospitals were defined as those with more than 50 inpatient beds and small hospitals were defined as those with 50 or fewer inpatient beds. Wilcoxon rank-sum tests were used to compare the median number of personnel, diagnostic technology, and programs and services by hospital size. Personnel included neurologists and neurosurgeons; interventional capabilities were also identified. Diagnostic equipment included each of the technologies listed in table one. Programs included Emergency Departments (ED), intensive care units, stroke units, inpatient rehabilitation units, stroke teams, ED stroke protocols, rt-PA protocols, acute stroke care maps or pathways, dedicated anticoagulation clinics, community stroke awareness programs, and EMS pre-hospital stroke assessment programs.

RESULTS

Fifty-eight of 67 (87%) hospitals responded to the survey. The mean inpatient bed size for these facilities was 49 (range 2 to 347). The mean bed size for large hospitals (>50 beds) was 178 (range 86 to 347), and the mean bed size for small hospitals was 19 (range 2 to 50).

Large hospitals were more likely to have ED stroke protocols (100% vs. 45%), acute stroke care maps or pathways (56% vs. 20%), and 24/7 (24 hours a day, 7 days a week) CT capability (80% vs. 40%) compared to small facilities (Figure 1A). The differences in the proportion of large and small hospitals that reported EMS pre-hospital stroke identification programs, (67% vs. 48%) and written rt-PA protocols (90% vs. 63%) were not statistically significant ($p > 0.05$). Large hospitals were more likely to have each of the other acute stroke diagnostic technologies compared to small hospitals and were more likely to have available in person or by phone at all times a neurologist (80% vs. 4%), neurosurgeon (70% vs. 2%), and interventional capabilities (60% vs. 13%) (Table 1). Large hospitals were also more likely to have community stroke awareness programs compared to smaller facilities (60% vs. 11%).

Facilities with more than 50 beds reported significantly more diagnostic technologies, programs and services, and personnel for stroke care (median = 18) compared to smaller hospitals (median = 6) (Table 2).

About three quarters of the population in the two-state region live in counties where the local facility had both 24/7 CT capability and a written rt-PA protocol in place (Figure 1B). And the majority of residents resided in counties with hospitals that had 24/7 CT capability (81%), rt-PA protocols (83%), ED stroke protocols (77%), a neurologist available 24/7 (54%), and EMS pre-hospital stroke identification programs (62%) (Table 1). It is interesting to note that 10 hospitals indicated that CT was available but not on a 24 hour schedule. Figure 2 illustrates the counties where facilities reported none, one, two or all three of the following components of acute stroke care: EMS pre-hospital stroke identification protocol, rt-PA protocol and 24/7 CT capability.

SUMMARY

Despite the limitations of the self-reported data, it is apparent that both large and small hospitals in this large region have begun efforts to organize systems to identify and treat acute ischemic stroke. Gaps and challenges remain. In several communities in the region, small outlying hospitals now link

Table 1. Availability of programs and services, diagnostic technology, personnel, and combined resources, overall, and by hospital size, Montana and northern Wyoming, 2004.

	Total (N = 58)† % (n/N)	Large hospitals* (N = 10)† % (n/N)	Small hospitals* (N = 48)† % (n/N)	Proportion of population‡ %
Outpatient/community services				
Community stroke awareness program	20 (11/56)	60 (6/10) §	11 (5/46)	49
EMS pre-hospital stroke identification program	51 (27/53)	67 (6/9)	48 (21/44)	62
Inpatient rehabilitation unit	49 (27/55)	56 (5/9)	48 (22/46)	60
Dedicated anticoagulation clinic	11 (5/44)	43 (3/7) §	5 (2/37)	32
Patient care units/areas and protocols				
Emergency department (ED)	100 (58/58)	100 (10/10)	100 (48/48)	100
Intensive care unit	60 (35/58)	100 (10/10) §	52 (25/48)	87
Stroke unit	7 (4/56)	20 (2/10)	4 (2/46)	33
Written ED stroke protocol	54 (30/56)	100 (9/9) §	45 (21/47)	77
Written rt-PA protocol	67 (39/58)	90 (9/10)	63 (30/48)	83
Acute stroke care map or pathway	26 (14/54)	56 (5/9) §	20 (9/45)	47
Acute stroke team	5 (3/58)	30 (3/10) §	0 (0/48)	23
Stroke diagnostic technology				
Cranial CT**	47 (27/58)	80 (8/10) §	40 (19/48)	81
CTA	30 (16/54)	100 (9/9) §	16 (7/45)	68
MRI	47 (27/58)	100 (10/10) §	35 (17/48)	81
MRA	38 (22/58)	80 (8/10) §	29 (14/48)	75
DWI	26 (14/55)	67 (6/9) §	17 (8/46)	57
Perfusion MRI	24 (13/55)	67 (6/9) §	15 (7/46)	54
Carotid duplex ultrasound	55 (32/58)	100 (10/10) §	46 (22/48)	86
TCD	23 (12/53)	88 (7/8) §	11 (5/45)	50
Conventional cerebral angiography	21 (12/56)	90 (9/10) §	7 (3/46)	60
TTE	31 (21/57)	90 (9/10) §	26 (12/47)	70
TEE	23 (13/56)	100 (10/10) §	7 (3/46)	64
Personnel for stroke care				
Neurologist**	18 (10/57)	80 (8/10)§	4 (2/47)	54
Neurosurgeon	14 (8/56)	70 (7/10)§	2 (1/46)	46
Interventional capabilities	22 (12/55)	60 (6/10)§	13 (6/45)	56

**Larger hospitals were defined as those with more than 50 inpatient beds and smaller hospitals were defined as those with 50 or fewer inpatient beds. †Because not all of the hospitals responded to each of the questions, the denominator for determining percentage in this column varies from question to question. ‡Proportion of the state's residents residing in a county whose hospital(s) provide each of the indicated diagnostic technologies, programs, and personnel in 2004. §P-value ≤0.05. **Cranial CT available 24 hours, seven days per week and neurologist available in person or by telephone 24 hours, seven days per week.*

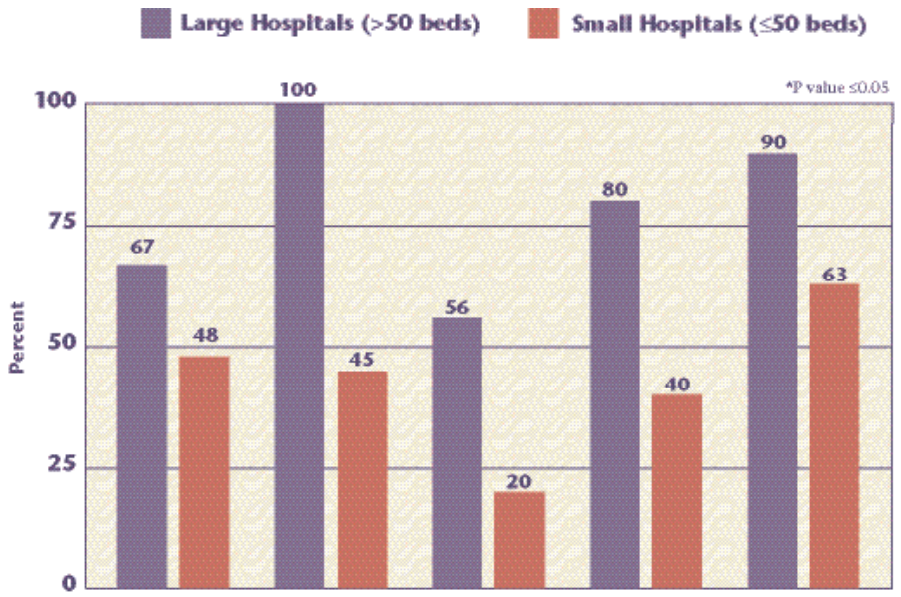
Table 2. Number of programs and services, diagnostic technology, personnel, and combined resources, overall, and by hospital size, Montana and northern Wyoming, 2004

	All hospitals Median (Range)	Large hospitals* Median (Range)	Small hospitals Median (Range)	P
Programs and services	4 (1-11)	6 (4-11)	4 (1-7)	<0.001
Diagnostic technology	3 (0-11)	10 (7-11)	1 (0-11)	<0.001
Personnel	0 (0-3)	3 (0-3)	0 (0-2)	<0.001
All resources	8 (1-25)	18 (13-25)	6 (1-17)	<0.001

**Larger hospitals were defined as those with more than 50 inpatient beds and smaller hospitals were defined as those with 50 or fewer inpatient beds.*

Figure 1. Availability of stroke recognition and treatment services, Montana and northern Wyoming, 2004: A. by hospital size, and B. by percent of Montana population.

A.



B.

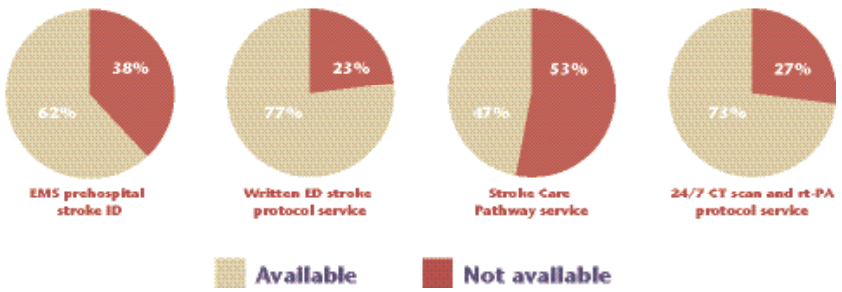
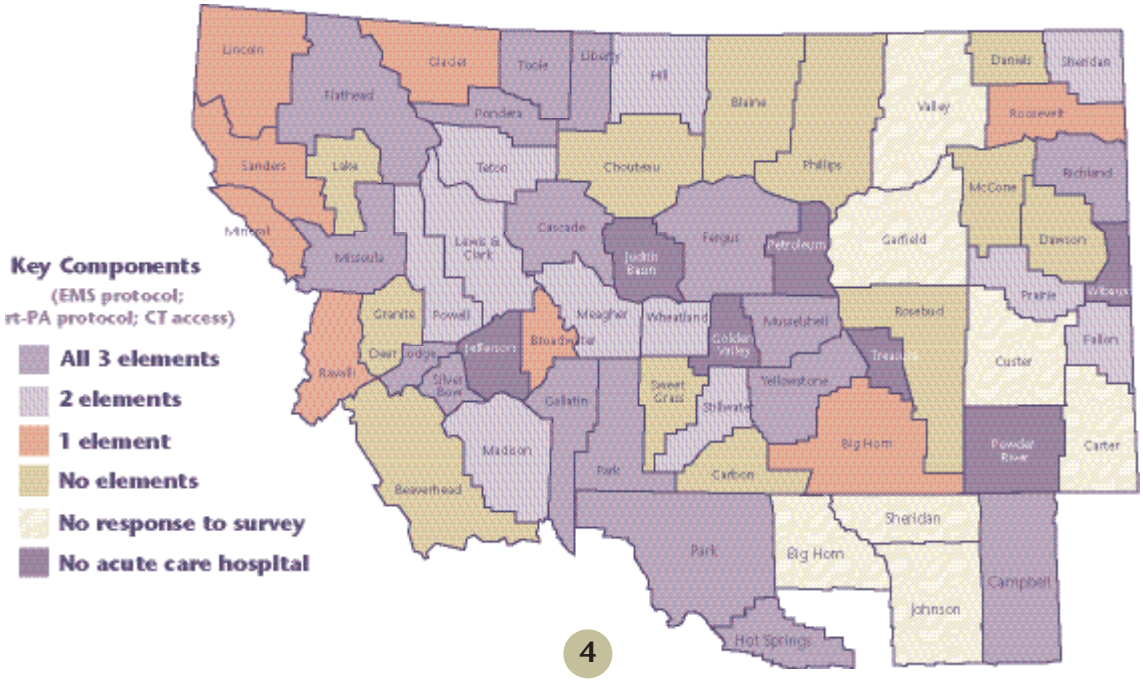


Figure 2. Availability of key components (EMS protocol; rt-PA protocol; 24/7 CT access) for diagnosis and treatment of stroke in Montana and northern Wyoming, 2004, by county.



their stroke services with a referral hospital. In addition, the state public health department in Montana has begun to support local efforts to improve community stroke awareness. It is our hope that this report will facilitate coordinated planning and development of acute stroke care across the region.

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CARDIOVASCULAR HEALTH SUMMIT, BIG SKY, MONTANA – FRIDAY, APRIL 8, 2005

The Montana Cardiovascular Health Program's Annual Cardiovascular Health Summit will be held on Friday, April 8, 2005, at Big Sky. This year's conference will include sessions on physician involvement in cardiac rehabilitation and prevention programs, clinical trials in heart failure, and omega-3 fatty acids. James Prochaska will be the keynote speaker. For more information or to register please contact Premier Planning at 406/442-4141 or e-mail Gail Brockbank at gailb@mt.net.

2005 DIABETES PROFESSIONAL CONFERENCE – MISSOULA, MONTANA – OCTOBER 6-7, 2005 SAVE THE DATE!

The Montana Diabetes Project's Annual Professional Conference will be held on Thursday and Friday, October 6-7, 2005, in Missoula, Montana at the Doubletree Inn. Guenther Boden M.D. will be the keynote speaker. Educational credits will again be offered. For more information call Susan Day at 406/444-6677 or e-mail sday@mt.gov.

WHAT ARE THE MONTANA DIABETES PREVENTION AND CARDIOVASCULAR HEALTH PROGRAMS AND HOW CAN WE BE CONTACTED?

The Montana Diabetes Control and Cardiovascular Health Programs are funded through cooperative agreements with the Centers for Disease Control and Prevention, Division of Diabetes Translation (U32/CCU822743-02), the Division of Adult and Community Health (U50/CCU821287-02) and through the Montana Department of Public Health and Human Services.

The mission of the Diabetes Control and Cardiovascular Health Programs is to reduce the burden of diabetes and cardiovascular disease among Montanans. Our web pages can be accessed at http://ahec.msu.montana.edu/diabetes/default.htm and http://montanacardiovascular.state.mt.us.

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MONTANA CLINICAL COMMUNICATION & SURVEILLANCE REPORT

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